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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/500,124

06/25/2004

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EXAMINER

NGUYEN, KHANH TUAN

ART UNIT

PAPER NUMBER

1796

MAIL DATE

DELIVERY MODE

08/27/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/500,124	Applicant(s) TAKAHASHI ET AL.	
	Examiner KHANH T. NGUYEN	Art Unit 1796	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on RCE filed on 08/14/2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,4-6,8-18 and 20-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 4-6, 8-18 and 20-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>06/05/2008 and 06/20/2008</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 08/14/2008 has been entered.

Response to Amendment

2. The amendment filed on 08/14/2008 is entered and acknowledged by the Examiner. Claims 1, 4-6, 8-18 and 20-24 are currently pending in the instant application. Claims 2-3, 7 and 19 have been canceled.

3. The rejection of claims 1, 4-18 and 20-24 under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Kudas et al. (U.S Pat. 6,951,666 B2) is withdrawn in view of Applicant's amendment and remark.

Information Disclosure Statement

4. The information disclosure statement (IDS) filed on 06/05/2008 and 06/20/2008 has been considered. An initialed copy accompanies this Office Action.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1, 5-6, 8-17 and 20-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Johnson Matthey Co. Ltd. et al. (G.B. Pat. 566,718 hereinafter, "G.B. '718") in view of Morrison, Jr. (U.S. Pat. 5,242,623 hereinafter, "U.S. '623").

With respect to instant claims 1, 5-6, 10, 16-17 and 24, G.B. '718 teaches a screen printable thick film paste useful as an electrical resistor or conductor on non-metallic articles such as glass, mica, porcelain, earthenware or electrical insulating material (Pg. 1, lines 8-19 and 42-47; Pg. 3, lines 55-56). The said thick film paste comprising of a finely divided silver compound comprises of silver oxide, silver carbonate or silver oxalate that is reduced by a reducing agent such as formaldehyde

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and formic acid (Pg. 1, lines 90-110). The said silver compound is mixed with 5 to 10% of lead borosilicate flux and the mixture is ground with 10% solution of cellulose nitrate in a 2:1 mixture of amyl lactate and pine oil to form a paste for silk screen printing (Example 1). The said paste is printed onto a non-metallic article and fired (i.e. heated) at a temperature at which the organic matter burns off and causes the silver powder to adhere firmly to the surface of the article (Pg. 2, lines 68-82).

The difference between the instant application and G.B. '718 disclosure is that G.B. '718 does not suggest the average particle diameter of the finely divided silver compound is about 0.01-10 microns. In addition, G.B. '718 uses cellulose nitrate instead of the claimed hydroxypropyl cellulose as a dispersant.

In an analogous art of screen printable thick film paste, U.S. '623 teaches a screen printable thick film paste useful as a conductive, resistive or dielectric material that can be applied onto an electrical insulating material such as alumina and ceramic (Col. 1, lines 13-16; Col. 2, lines 27-30 and line 59). The thick film resistor paste may contain resistive material such as metal oxides or noble metal (e.g. Ag) having a preferred particle size in the range of 0.1-10 microns (Col. 2, lines 33-53). The metal oxides is mixed in an organic medium comprising of a resin selected from ethyl cellulose, *cellulose nitrate*, hydroxyethyl cellulose, ethylhydroxyethyl cellulose, carboxymethyl cellulose, *hydroxypropyl cellulose* and the mixture and the derivatives thereof dissolved in a solvent such as alpha- or beta-terpineol (*pine oil*) and alcohols (Col. 3, line 10 to Col. 4, line 9).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the screen printable thick film paste of G.B. '718 by incorporating a finely divided silver oxide compound (fine metal oxide) of G.B. '718 having a particle size in the range of 0.1-10 microns as suggested by U.S. '623 into the paste and further substituting the cellulose nitrate of G.B. '718 with hydroxypropyl cellulose of U.S. '623 because such substitution is explicitly suggest by the prior art. The burden is upon the applicant to prove otherwise. *In re Fitzgerald*, 205 USPQ 594. In addition, the composition suggest by the prior art contains similar compounds as claimed, thus would generally be expected to have similar properties (e.g. volume resistivity, fusion property, specific gravity, viscosity and the like) since it has been held by the court that structurally similar compounds are generally be expected to have similar properties. *In re Gvurik*, 596 F. 2d 1012,201 USPQ 552. For example at column 4 lines 30-40, U.S. '623 teaches a thick film paste composition having similar viscosity as the claimed composition. Furthermore, the court has held that compositions are indefinite for being defined in terms of properties alone. *Ex parte Spacht*, 165 USPQ 409 (PO Bd Pat App 1969); *Ex parte Slob* 157 USPQ 172 (PO Bd Pat. App 1967); *Ex parte Pulvari*, 157 USPQ 169 (PO Bd Pat. App 1966).

Regarding claims 14 and 15, G.B. '718 teaches using a reducing agent to produce a finely divide silver particulate compound (Pg. 2, line 100 to Pg. 3, line 5). However, G.B. '718 does not explicitly suggest using the said reducing agent in an amount of about 0.5-10 moles with respect to about 1 mole of the particulate silver

compound as recited in the instant claims. Nonetheless, it would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize the proportions of the reducing agent and particulate silver compound of G.B. '718 through routine experimentation for best results. As to optimization results, a patent will not be granted based upon the optimization of result effective variables when the optimization is obtained through routine experimentation unless there is a showing of unexpected results which properly rebuts the *prima facie* case of obviousness. Applicants have not submitted factual evidence showing the criticality of the amount of reducing agent and that the claimed amount of reducing agent distinguish over the prior art.

7. Claims 1, 4-6, 8-18 and 20-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kudas et al. (U.S Pat. 6,951,666 B2 hereinafter, "Kudas") in view of Morrison, Jr. (U.S. Pat. 5,242,623 hereinafter, "U.S. '623").

With respect to claims 1, 4-6, 10, 14-18 and 24, Kudas discloses precursor composition (i.e. electrically conductive paste) forming a thick-film on a substrate such as glass, ceramic, metal, polymer, cellulose, metal and fabric (Col. 1, lines 21-24 and Col. 27, lines 3-23) by screen printing (Col. 29, lines 22-25). The precursor composition comprising of metal precursor, solvents, micron-sized particles having an average size of at least about 0.1 micron (Col. 4, lines 24-25 and Col. 24, lines 45-48), nanoparticles having average size from about 10 to 80 nanometer (Col. 4, lines 27-28), vehicles, reducing agent and other additives such as dispersant (Col. 2, lines 58-61 and Col. 4, lines 15-20). Kudas also discloses silver metal precursor are preferred, in particular,

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silver nitrate, silver oxide and silver carbonate (Table 1, Col. 8, lines 63-67 and Col. 14, lines 18-19). The reference further discloses a inducing agent (i.e. reducing agent) such as alpha terpineol (pine oil) or other low vapor pressure solvent such as diethylene glycol, ethylene glycol, hexylene glycol, NMP, tri(ethylene glycol) dimethyl ether and ethylene glycol diacetate capable of reducing silver oxide to silver at low temperature (Col. 13, lines 57-64, Col. 15, lines 46-53 and Table 4). The reducing agent is preferably at least about 20-60 weight percent (Col. 15, lines 21-28). Kodas discloses the electrically conductive paste composition may be printed onto a substrate (Col. 29, lines 10-21) and follow by heat treatment (Col. 29, lines 45-50). Kodas further discloses a rheology modifier for improving particle dispersion is selected from styrene allyl alcohol, *ethyl cellulose*, *carboxyl methylcellulose*, *nitrocellulose*, polyalkylene carbonates, ethyl nitrocellulose and the (Col. 20, lines 46-55).

The difference between the instant application and Kodas disclosure is that Kodas suggest using ethyl cellulose, carboxyl methylcellulose and nitrocellulose instead of the claimed hydroxypropyl cellulose as a dispersant.

In an analogous are of screen printable thick film paste, U.S. '623 teaches a screen printable thick film paste useful as a conductive, resistive or dielectric material that can be applied onto an electrical insulating material such as alumina and ceramic (Col. 1, lines 13-16; Col. 2, lines 27-30 and line 59). The thick film resistor paste may contain resistive material such as metal oxides or noble metal (e.g. Ag) having a preferred particle size in the range of 0.1-10 microns (Col. 2, lines 33-53). The metal oxides is mixed in an organic medium comprising of a resin selected from *ethyl*

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cellulose, cellulose nitrate, hydroxyethyl cellulose, ethylhydroxyethyl cellulose, carboxymethyl cellulose, hydroxypropyl cellulose and the mixture and the derivatives thereof dissolved in a solvent such as alpha- or beta-terpineol (*pine oil*) and alcohols (Col. 3, line 10 to Col. 4, line 9).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the screen printable thick film paste of Kodas by substituting the ethyl cellulose, carboxyl methylcellulose and nitrocellulose of Kodas with hydroxypropyl cellulose of U.S. '623 because such substitution is explicitly suggest by the prior art. The burden is upon the applicant to prove otherwise. *In re Fitzgerald*, 205 USPQ 594. In addition, the composition suggest by the prior art contains similar compounds as claimed, thus would generally be expected to have similar properties (e.g. volume resistivity, fusion property, specific gravity, viscosity and the like) since it has been held by the court that structurally similar compounds are generally be expected to have similar properties. *In re Gvurik*, 596 F. 2d 1012, 201 USPQ 552. For example, both Kodas (Abstract) and U.S. '623 (Col 4, lines 30-40) teach a thick film paste composition having similar viscosity as the claimed composition. Furthermore, the court has held that compositions are indefinite for being defined in terms of properties alone. *Ex parte Spacht*, 165 USPQ 409 (PO Bd Pat App 1969); *Ex parte Slob* 157 USPQ 172 (PO Bd Pat. App 1967); *Ex parte Pulvari*, 157 USPQ 169 (PO Bd Pat. App 1966).

Regarding claim 20, the lower limit of the instant claim includes 0 (zero) parts of dispersant, hence, the reference need not teach the presence of dispersants.

Regarding claim 21, U.S. '623 discloses a viscosity within the claimed range (Col. 4, lines 30-40). Kodas discloses a viscosity of at least about 1000 centipoise, which is equivalence to at least about 10 poise (Abstract).

Regarding claims 8-9, 11-13, 22 and 23, these claims contain phases such as "obtained by," "used to obtain" and "produced by" are considered to be product by process claims. The subject matter would have been obvious to the skilled artisan because the patentability of a product by process claim does not depend on its method of production and where the examiner has found a similar product, the burden rests with the applicant to prove that that product is patentably distinct. See *In re Thorpe*, 227 USPQ 964 (CAFC 1985); *In re Marosi et al*, 218 USPQ 289; *In re Pilkington*, 162 USPQ 145. "The lack of physical description in a product-by-process claim makes the determination of the patentability of the claim more difficult, since in spite of the fact that the claim may recite only process limitations, it is the patentability of the product claimed and not the process that must be established. We are therefore of the opinion that when the prior art discloses a product which reasonably appears to be identical with or only slightly different than a product claimed in a product-by-process claim, a rejection based alternatively on either section 102 or 103 of the statute is eminently fair and acceptable. As a practical matter, the Patent Office is not equipped to manufacture

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products by the myriad processes put before it and then obtains prior art products and makes physical comparisons therewith." In re Brown, 173 USPQ 685,688 (CCPA 1972).

Response to Arguments

8. Applicant's arguments with respect to claims 1, 4-6, 8-18 and 20-24 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to KHANH T. NGUYEN whose telephone number is (571)272-8082. The examiner can normally be reached on Monday-Friday 8:00-5:00 EST PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski can be reached on (571) 272-1302. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/KTN/
08/21/2008

/DOUGLAS MC GINTY/
Primary Examiner, Art Unit 1796